R E M A R K S

The above identified patent application has been amended and reconsideration and re-examination are hereby requested.

The Examiner objected to the specification under 35 U.S.C. 112, first paragraph, as not providing support for the invention as claimed in Claims 5 and 6. Applicants have amended Claim 5 to call for a charge donor layer ... a region of said charge donor layer having a dopant confined to a few angstroms thickness of said charge donor layer .... Applicants believe that this amendment to Claim 5 overcomes the objection raised by the Examiner to the specification. In particular, Applicants' Claim 5, as now amended, is clearly supported in the specification. For example, FIG. 1E shows a dopant spike 21 confined within the charge donor layer 22 as does FIG. 2 showing a dopant spike 59 confined within the charge donor layer 58.

The Examiner rejected Claims 2 and 4-6 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Applicants have amended Claim 2 to recite an after the word "material". Applicants have amended Claim 3 to recite that the first one of said charge screen layers is the third portion of said charge donor layer .... It is believed that

this amendment overcomes the rejection of Claim 4 as being indefinite. Applicants have also amended Claim 5 to call for a charge donor layer comprised of a second Group III-V material having a bandgap higher than that of the corresponding bandgap of the material of the channel layer .... It is believed that this amendment to Claim 5 overcomes the rejection of Claim 5 as lacking antecedent basis for said charge donor layer and said second Group III-V material. Applicants have also amended Claim 5, line 24 to call for atoms per cubic centimeter and have deleted "a/cc". Applicants have also amended Claim 6 to make it proper.

The Examiner rejected Claims 1-6 under 35 U.S.C. 102(b) as being anticipated by Smith, et al. The Examiner stated:

> Smith et al discloses a high electron mobility transistor (HFET) in fig. 1. It comprises:
>
> (a) a GaAs substrate;
>
> (b) an In GaAs channel layer disposed over the substrate;
>
> (c) a charge donor region (1st charge screen layer) comprised of a 1st region of undoped $Al_{0.25}Ga_{0.75}AS$ having a bandgap higher than the bandgap of the channel layer, a planar doping layer having a dopant concentration of $5X10^{12}$ cm^{-2} Si and a n type $Al_{0.25}Ga_{0.75}AS$;
>
> (d) a pair of n+ GaAs contact regions disposed over the 1st charge screen layer;
>
> (e) a gate electrode disposed in the n type $Al_{0.25}Ga_{0.75}AS$;

(f) a pair of source and drain electrodes contact with the n+ GaAs contact regions.

Applicants have amended Claim 1 to call for ... means for shielding ... comprising: a first charge screen layer corresponding to a portion of said charge donor layer; and a second charge screen layer comprised of a third Group III-V material having bandgap energy lower than the bandgap energy of said first Group III-V material being lightly doped and disposed adjacent the gate electrode and at least one of said, source and drain electrodes of the transistor. Applicants' Claim 1, as now amended, is patentably distinct over Smith, et al. since Smith, et al. neither describes nor suggests means for shielding at least one of the charge donor and channel layers from the effects of surface charges which are present in regions between gate and drain electrodes of the transistor with said means comprising a first charge screen layers ... and a second charge screen layer comprised of a third Group III-V material having a bandgap energy lower than the bandgap energy of the first Group III-V material disposed adjacent the gate electrode and source electrodes of the transistor.

Smith describes a heterojunction field effect transistor having a wide bandgap material (aluminum gallium arsenide) disposed as a contact to a gate electrode and disposed over on said wide bandgap material a heavily doped gallium arsenide layer. The heavily doped gallium arsenide

layer is represented in FIG. 1 of Smith as an n+ GaAs layer. The n+ GaAs layer is used to provide ohmic contact to source and drain electrodes of the doped channels pseudomorphic HFET structure described by Smith, et al. The n+ GaAs layer, however, does not read on a lightly doped Group III-V material. Accordingly, Claim 1, and thus Claims 2-4, are patently distinct over Smith.

Applicants' Claim 3 is further patently distinct over Smith since Smith neither describes nor suggests the second charge screen layer comprised of relatively lightly doped Group III-V material having a dopant concentration of $1X10^{17}$ to $5X10^{17}$ atoms/cc in a region thereof adjacent the gate electrode, source and drain electrodes .... Applicants' Claim 4 is also patentably distinct over Smith since Smith neither describes nor suggest that the first charge screen layer has a first recess having a first width ... and a second recess having a second, substantially larger width ... disposed through a portion of the thickness of the second charge screen layer.

Applicants' Claim 5 is also patentably distinct over Smith since Smith neither describes nor suggests a charge donor layer ... having a third region comprised of a relatively lightly doped portion of said second Group III-V material and a charge screen layer comprised of a lightly doped n- type region of said first Group III-V material

disposed over said third region of said charge donor layer. Applicants' Claims 5 and 6 are thus patentably distinct over Smith.

Applicants have added new Claims 7-16 which claim further patentably distinct features of Applicants' invention.

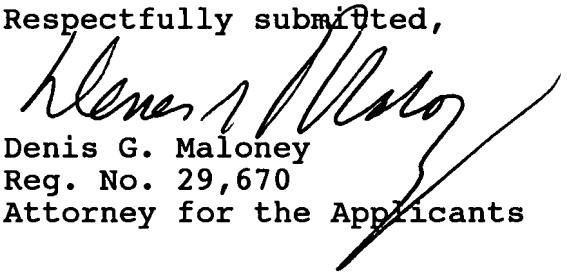
Applicants' Claims 7 and 8 are patentably distinct over the references for the reasons discussed in conjunction with the base Claim 1. Further, the particular recited materials, as claimed, are not suggested by Smith. Applicants' Claim 9 which recites that the charge donor layer is a first charge donor layer ... further comprising a second charge donor layer ... with said first charge donor layer and said second charge donor layer disposed to sandwich said channel layer is neither described nor suggested by Smith particularly in view of the base Claim 1. Likewise Applicants' Claims 10-13 are also patentably distinct over Smith in conjunction with their base claims.

Applicants' Claim 14 which calls for a high electron mobility transistor comprising ... said charge donor layer having a third region comprised of a relatively lightly doped portion of said second Group III-V material, a charge screen layer comprised of said first Group III-V material disposed over said third region of said charge donor layer with said charge screen layer having a portion of lightly

doped n-type material is neither described nor suggested by Smith. Further, Applicants' Claim 14 which further includes a pair of spaced contact regions comprised of said first Group III-V material having a dopant concentration greater than about $1X10^{18}$ atoms/cc disposed between said corresponding pair of source and drain electrodes and said charge screen layer is further patentably distinct over Smith. Likewise, Claims 15 and 16 which are dependent upon the respective base Claims 14 and 1 are patentably distinct over the references for the reasons discussed in conjunction with their base claims.

Accordingly, it is submitted that Claims 5 and 6, as amended, are supported by the specification, Claims 2, 4-6 are definite under 35 U.S.C. 112, second paragraph, and Claims 1-6, as amended, are patentably distinct over Smith. Furthermore, it is also submitted newly added Claims 7-17 are also proper and thus re-examination and reconsideration of the above identified patent are requested.

Respectfully submitted,



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